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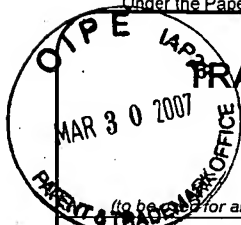
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PTO/SB/21 (09-06)

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## TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

21

Application Number

10/774,841

Filing Date

February 9, 2004

First Named Inventor

Frank JANSEN

Art Unit

1763

Examiner Name

Karla A. Moore

Attorney Docket Number

M03A210

## ENCLOSURES (Check all that apply)



Fee Transmittal Form



Fee Attached



Amendment/Reply



After Final



Affidavits/declaration(s)



Extension of Time Request



Express Abandonment Request



Information Disclosure Statement



Certified Copy of Priority Document(s)



Reply to Missing Parts/Incomplete Application



Reply to Missing Parts under 37 CFR 1.52 or 1.53



Drawing(s)



Licensing-related Papers



Petition



Petition to Convert to a Provisional Application



Power of Attorney, Revocation Change of Correspondence Address



Terminal Disclaimer



Request for Refund



CD, Number of CD(s) \_\_\_\_\_

☐ Landscape Table on CD

After Allowance Communication to TC



Appeal Communication to Board of Appeals and Interferences



Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)



Proprietary Information



Status Letter



Other Enclosure(s) (please identify below):

Fee Transmittal Form (PTO/SB/17, in duplicate), Appeal Brief (18 pp.), and Return Receipt Postcard

## Remarks

It is not believed at this time that any additional fee is due. As a precaution, the Commissioner is hereby authorized to charge to Deposit Account No. 02-2865 any additional fee required by this submission or credit any overpayment.

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## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name

The BOC Group, Inc.

Signature

Printed name

David A. Hey

Date

March 30, 2007

Reg. No.

32,351

## CERTIFICATE OF TRANSMISSION/MAILING

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Kimberly S. Brown

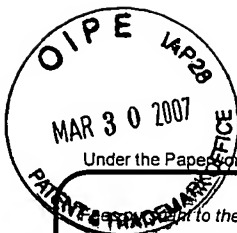
Date

March 30, 2007

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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# FEE TRANSMITTAL

## For FY 2007

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 500.00

**Complete if Known**

Application Number 10/774,841

Filing Date February 9, 2004

First Named Inventor Frank JANSEN

Examiner Name Karla A. Moore

Art Unit 1763

Attorney Docket No. M03A210

**METHOD OF PAYMENT** (check all that apply)☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): \_\_\_\_\_☒ Deposit Account Deposit Account Number: 02-2865 Deposit Account Name: The BOC Group, Inc.

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☒ Charge fee(s) indicated below☐ Charge fee(s) indicated below, except for the filing fee☒ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17☒ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

**FEE CALCULATION****1. BASIC FILING, SEARCH, AND EXAMINATION FEES**

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	

**2. EXCESS CLAIM FEES****Fee Description**

Each claim over 20 (including Reissues)

Fee (\$)

Small Entity Fee (\$)

50

25

Each independent claim over 3 (including Reissues)

200

100

Multiple dependent claims

360

180

**Total Claims****Extra Claims****Fee (\$)****Fee Paid (\$)**

- 20 or HP = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_

HP = highest number of total claims paid for, if greater than 20.

**Indep. Claims****Extra Claims****Fee (\$)****Fee Paid (\$)**

- 3 or HP = \_\_\_\_\_ x \_\_\_\_\_ = \_\_\_\_\_

HP = highest number of independent claims paid for, if greater than 3.

**Multiple Dependent Claims****Fee (\$)****Fee Paid (\$)****3. APPLICATION SIZE FEE**

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

**Total Sheets****Extra Sheets****Number of each additional 50 or fraction thereof****Fee (\$)****Fee Paid (\$)**

- 100 = \_\_\_\_\_ / 50 = \_\_\_\_\_ (round up to a whole number) x \_\_\_\_\_ = \_\_\_\_\_

**4. OTHER FEE(S)**

Non-English Specification, \$130 fee (no small entity discount)

**Fees Paid (\$)**

Other (e.g., late filing surcharge): Appeal Brief

500.00

**SUBMITTED BY**

Signature

Registration No. 32,351  
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Name (Print/Type)

David A. Hey

Date March 30, 2007

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Frank JANSEN

Serial No.: 10/774,841

Filed: February 9, 2004

Examiner: Karla A. Moore

Group Art Unit: 1763

Attorney Docket: M03A210

Confirmation No.: 9767

Title: BARRIER LAYER PROCESS AND ARRANGEMENT

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Commissioner for Patents  
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Alexandria, VA 22313-1450

SIR:

**APPEAL BRIEF**

The following Appeal Brief is respectfully submitted in connection with the above identified application in response to the Advisory Action dated 5 January 2007, rejecting claims 8, 9, 12-15 and 17-20.

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Real Party in Interest

The real party in interest for the above identified application are the inventors, and the assignee of the invention, The BOC Group, Inc.

Related Appeals and Interferences

There are no related appeals or interferences known to any of the Appellants, the undersigned or the assignee which will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 8, 9, 12-15 and 17-20 are rejected and are appealed. Claims 1-7 are withdrawn. Claims 10, 11 and 16 are canceled.

Status of Amendments

An amendment after final rejection was filed 30 November 2006 and has been acted upon by the Examiner. In particular, the Examiner indicated in the Advisory Action that the amendment would be entered for purposes of appeal. The Examiner further indicated in the Advisory Action that the claims as amended by the amendment after final stand rejected as follows:

Claims 8, 12-13, 15 and 18-20 would be rejected under 35 USC 103 as being unpatentable over Hwang in view of George.

Claims 9 and 17 would be would be rejected under 35 USC 103 as being unpatentable over Hwang in view of George as applied to claims 8, 12-13, 15 and 18-20 and further in view of Kokaku.

Claim 14 would be would be rejected under 35 USC 103 as being unpatentable over Hwang in view of George as applied to claims 8, 12-13, 15 and 18-20 and further in view of Ahn.

These rejections differ from those set forth in the Final Office Action of 7 September 2006, apparently because of the acceptance of the amendment after final rejection. Therefore, it is believed that it is only those rejections specifically stated in the Advisory Action that are under consideration for purposes of this Appeal and that all other rejections have been withdrawn.



Summary of Claimed Subject Matter

The present invention is directed to an arrangement and process for creating barrier layers on a substrate which form a diffusion barrier for oxygen and water vapor. More particularly, this invention provides an arrangement and process in which barrier layers are formed on plastic substrates using atomic layer deposition. The resulting barrier layers will conform more closely to the substrate surface and reduce the occurrence of pinhole leaks and cracks. The resulting films can meet the low oxygen and water diffusion rates required in industries like food and medical packaging and can replace more expensive packaging, such as glass jars. (Specification paragraphs 0001 and 0002)

Independent claim 8 of the present invention describes a method for preparing coated substrates using atomic layer deposition (ALD) techniques, wherein a polymer thin film is conveyed past at least two ALD sources so that the substrate is exposed to each source in succession. (Specification paragraphs 00011 and 00021 for example)

The present invention provides a method for forming barrier layers using an ALD process, wherein the barrier layers exhibit reduced permeability to oxygen and water vapor; conform closely to the substrate surface and exhibit a reduced amount of pinholes and cracks.

Grounds of Rejection to be Reviewed

1. Whether claims 8, 12-13, 15 and 18-20 are properly rejected under 35 USC 103 as being unpatentable over Hwang in view of George.
2. Whether claims 9 and 17 are properly rejected under 35 USC 103 as being unpatentable over Hwang in view of George as applied to claims 8, 12-13, 15 and 18-20 and further in view of Kokaku.
3. Whether claim 14 is properly rejected under 35 USC 103 as being unpatentable over Hwang in view of George as applied to claims 8, 12-13, 15 and 18-20 and further in view of Ahn.

Argument

1. Whether claims 8, 12-13, 15 and 18-20 are properly rejected under 35 USC 103 as being unpatentable over Hwang in view of George.

The Examiner has rejected claims 8, 12-13, 15 and 18-20 under 35 USC 103 as being unpatentable over Hwang in view of George. It is noted that this rejection has never before the Advisory Action been specifically set forth and further that the explanation of the rejection was not provided in the Advisory Action.

Therefore, the response provided below is based on the reasons set forth by the Examiner in the Final Office Action that related to rejections relying on the combination of the Hwang and George references.

These rejections are respectfully traversed and it is respectfully submitted that the present invention is patentably distinct from Hwang in combination with George. Hwang relates to a method and apparatus of atomic layer deposition wherein a series of vapor injector pipes are rotated above a number of stationary substrates that are being treated. Clearly this is vastly different from the method of the present invention wherein the substrate is conveyed past a series of fixed deposition sources. As noted by the Examiner, Hwang provides passing mention that the susceptors could rotate instead of the vapor injection pipes, but there is absolutely no detail of such an arrangement provided. While such an arrangement might be possible with the substrates (i.e., individual wafers) of Hwang, one skilled in the art would know that such an arrangement could not possibly work when the substrate is a polymer film as required by the present invention.

George was cited by the Examiner to show how specific thicknesses of an ALD deposited layer could be achieved. The Examiner concluded that the

combination of Hwang and George would be obvious to one skilled in the art wanting to produce layers of such thicknesses.

It is abundantly clear that George does not overcome the monumental deficiency in Hwang noted above. In fact, the Examiner has never questioned this deficiency. Rather, the Examiner notes in the Advisory Action that

“the recitation ‘polymer film substrate’ does not necessarily limit the pending claims to provision of a continuous, elongated substrate, rather than a wafer. The recitation can be interpreted as a wafer (i.e. substrate) comprising a polymer film. This interpretation renders mute Applicant(s) regarding whether or not Hwang et al. fairly teach the limitation of rotation of substrates and deposition sources relative to one another.”

In light of the above statements, it is respectfully submitted that the Examiner cannot conveniently ignore both the teachings of the present specification and of the prior art references cited to arrive at an “interpretation” that fits the needs of the rejection. In fact, the CAFC has held that:

“A claim phrase must be interpreted as it would be construed by one skilled in the art reading the relevant documents, and understanding that an inventor is permitted to be his or her own lexicographer, so long as idiosyncratic term usage is both comprehensible and reasonable.” (Grain Processing Corp v. American Maize-Products Co., 21 USPQ 2nd 1474, CAFC, 1991).

In this case, the Examiner has ignored the entire teaching and purpose of the present invention, i.e., methods for producing thin polymer films to be used

primarily for the packaging of food or medical items. The only use of the word "wafer" in the entire specification is in paragraph 00014 when describing typical ALD methods. Conversely, Hwang is solely concerned with ALD deposition of layers onto semiconductor wafer substrates. The Examiner's broad interpretation of the words "polymer film substrate" in the present claims is quite simply wrong. In fact, it would appear that the only purpose for such interpretation is for the Examiner to be able to apply impermissible hindsight to make the rejection. Further, the decision by the Examiner that the interpretation renders moot (or mute) the arguments raised by the Applicant is no more than a convenient way to avoid answering the arguments set forth.

Therefore, it is again stated that the method of Hwang could not possibly be used to deposit layers on the polymer film substrates of the present invention. Further, George provides virtually no description of methods for carrying out ALD depositions and certainly has no suggestion whatsoever as to how such could be used to overcome the deficiencies of Hwang.

It is respectfully submitted that present claims 8, 12-13, 15 and 18-20 are patentably distinct from Hwang in view of George and it is respectfully requested that the rejection of such claims under 35 USC 103 be reviewed and overturned by the Board of Appeals.

2. Whether claims 9 and 17 are properly rejected under 35 USC 103 as being unpatentable over Hwang in view of George as applied to claims 8, 12-13, 15 and 18-20 and further in view of Kokaku.

The Examiner rejected claims 9 and 17 under 35 USC 103 as being unpatentable over Hwang in view of George and further in view of Kokaku. In the Final Office Action, Kokaku was cited for the purposes of teaching the use of

rotating drums to convey a substrate through a processing chamber. In the Advisory Action, the Examiner baldly states that:

“Kokaku et al. teach provision of a rotatable drum for carrying a continuous, elongated substrate through a plurality of processing stations for a deposition process.”

but offers no further explanation as to how this would be applied in the rejections.

Applicant respectfully submits that in order to support a conclusion that a claimed combination is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed combination or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teaching of the references. (See Ex parte Clapp, 227 USPQ 972; PTO Bd of APP INT, 1985.) Further, Applicant respectfully submits that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination. (See ACS Hospital Systems, Inc. v. Montefiore Hospitals, 221 USPQ 929; Fed Cir. 1984.)

The Applicant respectfully submits that Hwang, George and Kokaku clearly fail to expressly or impliedly suggest the combination proffered by the Examiner. Further, the Examiner has failed to provide any reason in support of the combination. In this light, Hwang relates to a method requiring a series of vapor injector pipes that are rotated above a number of stationary substrates to be treated. George has not been cited for anything related to the method and therefore is largely irrelevant in this discussion. Kokaku indeed shows the use of a drum to convey a film past a plasma treatment chamber, but clearly fails to suggest anything analogous to that described in Hwang. There is simply no incentive in any of the references cited for one skilled in the art to attempt the

combination suggested by the Examiner's rejection. Further, the Examiner has never offered any clear reasoning or discussion as to how the Hwang and Kokaku references could be combined. In fact, such a combination would make little or no sense and would obviate any advantages provided by the individual references.

Therefore, it is respectfully submitted that even if the references cited could be combined in some manner, the combination would not result in a method defined by the instant claims. It is respectfully submitted that claims 9 and 17 are patentably distinct from Hwang in view of George and further in view of Kokaku, and it is respectfully requested that the rejection of such claims under 35 USC 103 be reconsidered by the Board of Appeals and overturned.

3. Whether claim 14 is properly rejected under 35 USC 103 as being unpatentable over Hwang in view of George as applied to claims 8, 12-13, 15 and 18-20 and further in view of Ahn.

The Examiner rejected claim 14 under 35 USC 103 as being unpatentable over Hwang in view of George and further in view of Ahn, wherein Ahn was cited solely to show the use of particularly oxidizing agents and trimethylaluminum in ALD processes.

This rejection is respectfully traversed and it is respectfully submitted that Ahn clearly fails to overcome the deficiencies of Hwang and George noted above. Therefore, it is respectfully submitted that claim 14 is patentably distinct from Hwang in view of George and further in view of Ahn and it is respectfully requested that the rejection of such claims under 35 USC 103 be reconsidered by the Board of Appeals and overturned.

Conclusion

For the reasons noted above, Appellants respectfully submit that the Examiner's rejection of claims 8, 9, 12-15 and 17-20 is not properly founded in law and, therefore, it is respectfully requested that the Board of Appeals so finds and reverses the Examiner's rejections of such claims.

A copy of the claims on appeal, i.e., 8, 9, 12-15 and 17-20, is found in the attached appendix. To the extent necessary, Appellants petition for an extension of time under 37 CFR 1.136 by separate letter.

Respectfully submitted,



David A. Hey  
Registration No. 32,351  
Attorney for Applicant  
Date: March 30, 2007

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CLAIMS APPENDIX

8. A method for preparing a coated substrate comprising:  
providing an atomic layer deposition arrangement comprising an evacuable chamber, and at least two atomic layer deposition sources within the chamber, wherein each atomic layer deposition source is isolated from the remainder of the chamber,  
conveying a polymer film substrate past each atomic layer deposition source in succession, and  
exposing the substrate to each atomic layer deposition source as the substrate is conveyed past.
9. A method according to claim 8 wherein conveying a substrate past each atomic layer deposition source comprises carrying the substrate on a rotatable drum located in the chamber.
12. A method according to claim 8 wherein the polymer is polyethylene terephthalate, low density polyethylene, high density polyethylene, polypropylene, polycarbonate, polyvinylidene chloride, ethylene vinyl alcohol, polyacrylate, polyamide or combinations thereof.
13. A method according to claim 8 wherein at least one atomic layer deposition source is a source of trimethylaluminum.
14. A method according to claim 15 wherein the oxidizing agent is oxygen, nitrous oxide, or ozone.
15. A method according to claim 8 wherein at least one atomic layer deposition source is a source of oxidizing agent.

17. A method according to claim 8 wherein conveying a substrate past each atomic layer deposition source comprises
  - providing a rotatable substrate source drum having substrate film wrapped there around, and providing a rotatable collection drum,
  - rotating the substrate source drum and conveying the substrate film into the chamber, and
  - rotating the collection drum and receiving the substrate film exiting the chamber.
18. A method according to claim 8 further comprising introducing an inert gas into the chamber.
19. A method according to claim 18 wherein the inert gas is argon or oxygen.
20. A method according to claim 8 wherein a barrier coating having a thickness of 400 Å to 50 Å is formed on the substrate.

EVIDENCE APPENDIX

Not Applicable

RELATED PROCEEDINGS APPENDIX

Not Applicable